METHODS FOR MAKING
SLIP RESISTANT FILE FOLDERS

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This application is a divisional of and claims priority to U.S. Serial No. 09/463,229 entitled Slip Resistant File Folders, priority date December 18, 1997.

FIELD OF THE INVENTION

This invention relates to improvements in file folders, expandable folders, hanging folders, and the like.

BACKGROUND OF THE INVENTION

File folders have become a necessity in today's modern offices and businesses. Such folders may be as simple as stiff, folded paperboard, often having predetermined cut out or raised areas for attaching labels or other identifying indicia. File folders, such as manila folders, are useful for storing paper and related articles in an orderly manner in file drawers or cabinets. Many improvements have been made to the simple file folder, including expandable folders that can hold a large amount of papers, reinforced edges for stronger, longer lasting use, and clasp means for positively securing the file contents so that enclosed papers stay organized and do not fall out.

Many variations of the simple file folder are known. For example "file pockets" are expandable file folders having fan-folded sides for higher capacity storing of papers. File pockets come in a variety of sizes, including letter and legal size. "Expanding files" are similar to file pockets, but generally have a flap attached that can be secured to a front cover to prevent papers from falling out the top of the file. Expanding files often have numerous pockets inside which are sometimes indexed for added organizational capability. Closely related to expanding files are expanding wallets, which generally have an elastic cord attached to the flap which can be used to secure the flap in a closed position.

In addition to simple file folders, file pockets, expanding files and expanding wallets, it is known to use hanging folders for receiving file folders and the like.

Hanging folders are made for use in standard storage units such as file cabinets, desk drawers and the like. Hanging folders are generally formed of a sheet of heavy weight paper with a central horizontal fold which forms the folder's bottom and has open sides. Folds are provided in the file's top edges through which hanging rods are movably or immovably fixed. The ends of these rods are exposed and notched, enabling the file to hang on a complementary standard parallel file frame in office storage equipment, such as filing cabinets and desk drawers.

Improvements to hanging folders include providing the inner surfaces of the folded over portions at the top of each flap with uniformly spaced slots for insertion of labeling tabs. Reinforcing plastic film may be applied to the exposed edges to reduce wear as the file is moved in the frame or file drawer. This film may be applied with colored adhesive to provide a color coding system or a clear film may be applied over a colored surface by clear adhesive to achieve the same result. Hanging folders with strong, flat bottoms have been made to handle oversized or heavy contents. Other various improvements to hanging folders are exemplified in the art, including various means for attaching labeling, as well as adapting the hanging folder concept for a wide variety of articles, such as hanging loose-leaf ring binders.

One drawback to existing file folders and hanging folders is the relative difficulty in removing such folders from file drawers, file cabinets, and the like, especially when such folders are oversized, such as relatively full expandable folders or full flat-bottom (box-bottom) hanging folders. It is often necessary to remove a folder to inspect, remove, or add to its contents, and it is often necessary to remove an entire file pocket or hanging folder for similar reasons. Removal is generally accomplished by gripping the top edges of the folder and lifting it out of the drawer. However, it is difficult to grip the top of a very full, thick, folder to remove it from the file drawer without it slipping, possibly falling and spilling its contents. This is because the paper stock used for existing folders is generally very smooth, and somewhat slick, requiring the person removing the file to exert extremely high pressures to lift the folder. Even pulling a relatively thin file folder or hanging folder out of a full drawer is made more difficult by the pressure of adjacent files. Often it is necessary to use two hands to grip a folder for removal. This problem is especially pronounced for older persons, persons having arthritis, or persons otherwise being incapable of applying sufficient grip strength.

Accordingly, it would be desirable to have a slip-resistant file folder, hanging folder, and the like, that is easy to grip and remove from its drawer or cabinet.

Additionally, it would be desirable to be able to adapt an existing file folder, hanging folder, and the like, to be slip-resistant for easier removal from a drawer or cabinet.

Additionally, it would be desirable to be able to economically produce slip-resistant file folders, hanging folders, and the like.

SUMMARY OF THE INVENTION

Methods for producing easily and securely gripped slip-resistant file folders, including file pockets and hanging folders are disclosed. The methods include providing folder paper stock; conveying the folder paper stock in the process of folder manufacture; providing a curable slip-resistant material in a melt state; applying the slip-resistant material at predetermined areas of the folder paper stock; and curing the slip-resistant material; such that the slip-resistant portion comprises cured slip-resistant material. Another method includes providing folder paper stock; providing embossing dies in spaced, operable, mating relationship; positioning the folder paper stock appropriately in the embossing dies; applying force to at least one of the embossing dies so as to decrease the spaced relationship; and deforming the folder paper stock.

BRIEF DESCRIPTION OF THE DRAWINGS

While the specification concludes with claims particularly pointing out and distinctly claiming the present invention, it is believed that the present invention will be better understood from the following description in conjunction with the accompanying Drawing Figures, in which like reference numerals identify like elements, and wherein:

FIG. 1 is a perspective view of a typical file folder, such as a manila folder having a slip resistant portion disposed upon at least one flap;

FIG. 2 is a perspective view of a person gripping a folder of the present invention at the top for removal such as by lifting out of a drawer or cabinet;

FIG. 3 is a partial cut away view along Section 3-3 shown in FIG. 2, showing a slip-resistant portion in the form of a slip-resistant member affixed to a flap of the folder;

FIG. 4 is a partial cut away view, similar Section 3-3 shown in FIG. 2, showing another embodiment of a slip-resistant portion in the form of a slip-resistant member affixed to a folder;

FIG. 5 is a partial cut away view depicting another embodiment of a slip-resistant portion, namely a raised, embossed area;

FIG. 6 is a side view of three file folders of the present invention showing vertically-offset slip resistant portions;

FIG. 7 is a perspective view of a file pocket showing another embodiment of a slip-resistant portion of the present invention;

FIG. 8 is a perspective view of an expanding file showing another embodiment of a slip-resistant portion of the present invention;

FIG. 9 is a perspective view of a hanging folder showing another embodiment of a slip-resistant portion of the present invention;

FIG. 10 is a perspective view of a flat-bottom hanging folder showing still another embodiment of a slip-resistant portion of the present invention;

FIG. 11 is a schematic illustration of an apparatus and process for producing folders of the present invention;

FIG. 12 is a schematic illustration of an alternative apparatus and continuous process for producing folders of the present invention;

FIG. 13 is a schematic illustration of an alternative apparatus for producing folders of the present invention;

FIG. 14 is a schematic illustration of an alternative process for producing folders of the present invention;

FIG. 15 is a perspective view of a file pocket showing another embodiment of a slip-resistant portion of the present invention; and

FIG. 16 is a perspective view of a file pocket showing another embodiment of a slip-resistant portion of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

As used herein, when used alone, the term "folder" encompasses all of "file folders", "file pockets", "expanding files", "expanding wallets", and "hanging

folders" as well as other folding articles that may be stored in a file drawer or cabinet, such as hanging ring binders, bound presentation folders, and the like.

As used herein, the term "file folder" means folders such as manila, kraft, pressboard, or plastic, typically supplied in letter or legal size. File folders come in a variety of "points", which denote the weight of the paper stock used for the folder. File folders are supplied with various improvements, such as color coding, undercut tabs for labeling, reinforcing strips along edges, and fasteners to hold papers attached in various positions. By way of example, a manila file folder suitable for the present invention is the Smead 152L heavyweight 11 pt. manila folder, available from the Smead company, Hastings, MN.

As used herein, the term "file pockets" means expandable pockets having fan-folded sides and a fan-folded bottom, useful for large files. File pockets have a larger capacity than file folders, and may be used in standard filing systems, including hanging files. By way of example, a file pockets suitable for the present invention is the Wilson Jones 64 series 3-1/2 inch expansion COLORLIFE® file pocket, from the Wilson Jones Company, or the Smead 1524E Redrope® Pockets. File pockets are often reinforced to provide maximum durability and capacity.

As used herein, the term "expanding files" means expandable filing folders, generally having a fan-folded bottom, full fan-folded sides, and a fold-over flap that is used to securely close the file. By way of example, an expanding file suitable for the present invention is the 21-pocket Smead DR117A expanding file with flap, available from the Smead company.

As used herein, the term "expanding wallets" means expandable filing folders similar to expanding files. Expanding wallets generally have elastic cord tie flaps for securely closing a top flap. By way of example, expanding wallets suitable for the present invention include the Oxford Plus® 60343 3-1/2 inch expansion reinforced wallets.

As used herein, the term "hanging folder" means folders designed for use with hanging file systems. Such folders come in many variations including box-bottom, expandable, color-coded, and reinforced-edge, durable designs. By way of example, hanging folders suitable for the present invention include standard size folders such as the Esselte Pendaflex® 4152 series (letter size) and 4153 series (legal size) folders; box bottom folders such as the Esselte Pendaflex® 4152X series (letter size) and 4153X series (legal size) folders; expanding file pockets such as the Smead 18H24ESS (letter size) and 18H26ESS (legal size) folders; and hanging expanding

files such as the Globe-Weis GlobalFile® 85030 expanding hanging file. A further example of hanging folders of the type useful for the present invention is disclosed in U.S. Pat. No. 5,275,439 to Hawes, Jr. et al., issued January 4, 1994.

As used herein, "high coefficient of friction" means a coefficient of friction between a folder and a person's fingers that is sufficient to resist slippage of the folder from the person's grip when lifting a folder out of a file drawer. It is acknowledged that sufficient friction will depend on a variety of factors, including a person's grip and the weight of the folder, as well as other environmental factors such as relative humidity. For this reason, "high coefficient of friction" is not meant to denote any absolute number or level, but is generally substantially higher than the coefficient of friction between typical folder paper stock and a user's fingers when gripping a folder from the top. It is otherwise simply descriptive in principle of the desired characteristic of a suitable material (or paper configuration) for use as the slip-resistant portion of the present invention. In other words, whether a material is applied as the slip resistant member, or the paper is deformed, *e.g.*, as by embossing, the effect is an increase in the frictional force between the folder and the user's fingers. The increase can be due to an actual increase in the coefficient of friction due to addition of a material such as a light tack adhesive, or it can be due to a change in normal forces due to a change in folder geometry, such as by embossing.

A typical embodiment of a folder **10** of the present is shown in FIG. 1, which shows a file folder **20**. File folder **20** has a front flap **22** hingedly connected to a rear flap **24** at folder bottom **26** along a medial fold. In use, folder bottom **26** is disposed horizontally, generally parallel to top edges **25**. According to the present invention, file folder **20** also has a slip-resistant portion **1** disposed on at least one flap, but preferably on both the front flap **22** and rear flap **24**. Slip-resistant portion **1** can be disposed as a horizontal band of material affixed near top edges **25**. As shown below, the purpose of slip-resistant portion **1** is to provide a region of the folder with a high coefficient of friction to allow easier slip-resistant gripping of the folder for lifting the folder from its drawer.

Slip-resistant portion **1** may comprise a variety of materials, configurations, patterns, and positions, but in general, the purpose of the slip-resistant portion is to provide a region of the folder having a high coefficient of friction between a user's fingers and the folder as it is being removed from a file drawer. For this reason, the slip-resistant portion can be comprised of a slip-resistant material, such as a light-tack adhesive that has a high coefficient of friction. A wide range of adhesives may be used, but in a preferred embodiment the slip-resistant portion comprises a

permanently tacky pressure-sensitive adhesive. By "pressure sensitive" is meant that the adhesives of the invention are tacky to the touch at room temperature (e.g., about 20 degrees C.), as can be readily determined by a finger tack test, and can easily form a useful adhesive bond with the application of light pressure. Pressure-sensitive adhesives are commonly used for adhesive tapes and labels, often with release liners for ease of delivery and application. Pressure sensitive adhesives may be rubber-based or acrylic/acrylate-based, with or without tackifiers added to impart tack or stickiness. In a preferred embodiment the slip-resistant portion is applied in the hot melt state and allowed to cure to a light tack during folder manufacture. Typical recipes for such adhesives are shown in the Encyclopedia of Polymer Science and Engineering, Herman F. Mark, Ed., 1988, Vol. 13, under the heading Pressure Sensitive Adhesives and Products, which section is hereby incorporated herein by reference. In addition to the adhesive properties, the placement and pattern of the slip-resistant portion also contributes to its performance.

A currently preferred pressure sensitive adhesive for use as the slip-resistant portion of the present invention is a removable adhesive such as the pressure sensitive adhesive having a low tack utilized on Post-it® notes. For example, a suitable adhesive is an acrylate copolymer which is described in U.S. Pat. No. 3,691,140, issued September 12, 1972 to S. F. Silver, assigned to the Minnesota Mining & Manufacturing Co. of St. Paul, MN., and improvements thereof. The adhesive is described as having infusible solvent-dispersible, solvent-insoluble, inherently tacky, elastomeric copolymer microspheres consisting essentially of about 90 percent by weight of at least one alkyl acrylate ester and about 10 to about 0.5 percent by weight of at least one monomer selected from the group consisting of substantially oil-insoluble, water-insoluble, ionic monomers and maleic anhydride. The microspheres are prepared by aqueous suspension polymerization utilizing emulsifier in an amount greater than the critical micelle concentration in the absence of externally added protective colloids or the like. The disclosure of the above-mentioned Silver '140 patent is hereby incorporated herein by reference.

Improvements to acrylate copolymer adhesives include improvements to the processibility of the adhesive. In particular, such adhesives have been improved to take advantage of the procedural, economical and environmental advantages of a hot melt processible adhesive. For example, an adhesive suitable for use as the slip-resistant material of the present invention is an acrylic pressure sensitive adhesive which displays a superior balance of tack, peel strength and cohesive strength for hot melt processing as disclosed in U.S. Pat. No. 5,552,451, issued September 3, 1996 to

Everaerts et al., assigned to the Minnesota Mining & Manufacturing Co. of St. Paul, MN, the disclosure of which is hereby incorporated herein by reference. The adhesive is described as a permanently removable, low melt viscosity acrylic pressure-sensitive adhesive having three components: (1) at least one lower alkyl acrylate having an alkyl group which comprises from about 4 to 12 carbon atoms, (2) at least one higher alkyl acrylate having an alkyl group which comprises from about 12 to 26 carbon atoms and (3) sufficient crosslinker to impart cohesive strength to the adhesive. Such removable pressure-sensitive adhesives, depending upon the viscosity, can be coated via any of a variety of conventional coating methods, such as roll coating, knife coating, hot melt coating, or extrusion.

In a preferred embodiment, the pressure sensitive adhesive used as the slip-resistant portion of the present invention has very light tack, or "stickiness". Additionally, it is believed to be advantageous to have a removable pressure sensitive adhesive having excellent shear strength, and reduced adhesive transfer to a person's fingers upon gripping and releasing a folder of the present invention. Such an adhesive is disclosed in U.S. Pat. No. 5,663,241 issued September 2, 1997 to Takamatsu et al., assigned to the Minnesota Mining & Manufacturing Co. of St. Paul, MN, the disclosure of which is hereby incorporated herein by reference. The disclosed adhesive comprises polyhydrazide to microparticles, producing an adhesive having excellent shear strength, and reduced adhesive transfer.

Alternatively, other high coefficient of friction polymeric materials, such as rubber-based adhesives (e.g., contact cement), or polymeric materials, for example low durometer polyurethane, may be applied in ways known in the art. Additionally, as shown below, the slip-resistant portion may be affixed in tape form to folders or formed by permanently deforming the flaps of the folder, such as by embossing. Whether affixed, applied, or formed by embossing, the slip-resistant portion is preferably an integral part of the folder. However, it is contemplated that a removable slip-resistant portion may be desirable, such that it may be removed by the user if unwanted. A slip-resistant portion comprising removable double-back tape may be removed if desired.

Slip resistant portion **1** can also be formed integrally with the folder by mechanical methods such as embossing. Embossing can be accomplished by pressing the folder between embossing dies, such as those described with reference to FIG. 13 below. Embossing is believed to advantageously increase the frictional force between the folder and a user's fingers by providing ridges or other such

deformations for gripping. Further advantages of embossing are described with respect to the FIGs. below.

As shown in FIG. 2, the advantage of the present invention is that the folder **10**, especially a thick folder or a hanging folder with many papers enclosed, may be gripped easily and securely for removal from its drawer or cabinet. As shown, slip-resistant portion **1**, here shown as embossed ridges, is preferably positioned such that as a person's hand **2** grips the folder from the top, the user's fingers (not shown) and thumb contact the slip-resistant portion **1**. In this manner, the high coefficient of friction allows the person **2** to lift the folder **1** without as tight a grip as would be necessary without slip-resistant portion **1**.

In one embodiment, slip-resistant portion **1** can be affixed as a narrow band of material near the top edge of either or both the front and rear flaps of a folder. By "near the top edge" is meant within normal reach of a person's thumb or fingers when grasping a folder from the top, for example to lift it out of a drawer. In particular, a band approximately 6-25 mm (1/4-1 inch) wide in an area 20-80 mm (about 1-3 inches) from the top edge of the folder flap is currently considered optimal. The band need not extend the whole width of the folder, but should at least span the central portion of the width. In general, as shown in FIG. 2, as a person grips a folder the thumb contacts one flap, while the fingers contact the opposing flap. Having a slip-resistant portion on both flaps assures that both the thumb and fingers contact areas of high coefficient of friction, making gripping easier. In certain embodiments, however, it is contemplated that having a slip-resistant portion on only one flap may be desirable.

As shown in FIG. 3, slip-resistant portion **1** may be any material **4** that has a high coefficient of friction which is applied or affixed as a layer to front flap **22** or rear flap **24** (not shown). In a preferred embodiment, material **4** is a light-tack pressure-sensitive adhesive applied in a uniform layer as a horizontal stripe or band near the top edges of folder **10**. By way of example, suitable light-tack adhesives include adhesives of the type and tack used on Post-it® notes. Such an adhesive is tacky enough to give a high coefficient of friction between a persons fingers and the folder, but not so tacky as to be a nuisance during normal use of the folder. Person's skilled in the art will recognize that in addition to the examples provided above (*i.e.*, adhesives disclosed in US patents assigned to the Minnesota Mining and Manufacturing Co.), a wide range of adhesives from numerous sources could be used or adapted for use as a slip-resistant portion. The examples given, therefore, are to be exemplary and not limiting.

Slip-resistant portion **1** may be discontinuous, such as stripes or dots in a regular or random pattern, or a continuous network of interconnected beads or lines of adhesive, for example. By varying the amount and placement of slip-resistant material, the overall tackiness of slip-resistant portion **1** may be varied. If desired, a release strip **5** may be supplied covering the light-tack adhesive, as shown in FIG. 3. In this manner, the end user may activate the slip-resistant feature at will by removing all or part of the release strip **5**.

If light-tack adhesive, or other pressure sensitive adhesive, is used for slip-resistant portion **1**, it may be applied and cured in a continuous process during manufacture of the folder **10** as described below with reference to FIGS. 10-11. However, it is possible to adapt existing folders to folders of the present invention. For example, as shown in FIG. 4, one method of producing a folder of the present invention is to add strips of light-tack adhesive in tape form to an existing folder **10**. As shown, a first strip of tape **6**, such as a 3/4-inch wide strip of 3M Scotch® double-coated tape 665 is applied to one flap, such as front flap **22**. This tape, having adhesive on both sides, could be used alone, with the outwardly-facing side being of high coefficient of friction serving as the slip-resistant portion. However, the tack may too great, so to make a light-tack slip resistant portion, a second strip of tape **8** having a light-tack may be affixed to the first layer **6**, such that the light-tack side is outwardly facing from the folder. A preferred second strip **8** is 3/4-inch 3M Scotch® Removable Magic® 811 tape which is advertised as having the same self-stick adhesive as Post-it® notes. Alternatively, by way of example, second strip **8** may comprise Post-it® 652 correction and cover-up tape, with the tacky side outwardly facing. Alternatively, existing folders may be adapted by simply applying a layer of reusable adhesive from a suitable glue stick, such as Scotch® Restickable Adhesive Glue Stick, Cat. No. 06314, available from 3M Consumer Stationery Division, St. Paul, MN.

While one embodiment of slip-resistant portion **1** comprises a material applied or affixed to the front or back flaps of a folder **10**, it need not be so. For example, as shown in cross-section in FIG. 5, slip-resistant portion **1** may be made by mechanically deforming the paper structure to form raised bumps or ridges. One method of deforming is embossing, in which the paper stock is pressed between forming dies to be permanently deformed in the desired pattern. One pattern, as shown in FIG. 5, is a plurality of horizontal, generally parallel ridges and valleys **9**. The advantage of embossing, rather than applying adhesive, is that the resulting slip-resistant portion is not tacky to the touch, eliminating any possible negative effects

of having such a tacky surface. Persons skilled in the art will recognize that the possible patterns for embossing are virtually limitless. Certain preferred patterns are shown in FIGs. 15 and 16. Therefore, the configuration depicted in FIG. 5 is exemplary, and not limiting.

While the raised ridge-like structures shown in FIGs. 5, 15, and 16 are preferably formed by embossing the paper stock during folder manufacture, persons skilled in the art will recognize that other methods and techniques may be employed with similar results. For example, the paper may be formed in the wet state and molded into the configurations shown. Furthermore, a separate paper or plastic strip with embossed or molded ridges may be joined to a folder to form slip-resistant portion **1**. For example, a thin plastic strip of relatively rigid polypropylene may be molded with suitably placed ridges, and adhered to the folder in a suitable location. Therefore, embossing to form ridges or ridge-like structures is meant to be exemplary, even preferred, but not limiting.

When pressure-sensitive adhesive is used, the slip-resistant portion **1** on the front flap **22** is preferably vertically offset a certain distance from the slip-resistant portion **1'** on the rear flap **24**. In this regard, the "vertical" direction refers to the direction orthogonal to a top edge **25** of a folder flap, generally in the plane of the respective folder cover. As shown in FIG. 6, a vertical offset prevents the slip-resistant portions on the rear flap of one folder from interfering with the slip resistant portion on the front flap of an adjacent folder in a drawer, possibly causing them to stick excessively to one another. FIG. 6 shows three folders **20** as they may be situated in relation to one another in a file drawer. Although file folders are shown, the principle shown holds for all types of folders, including file pockets and hanging folders. The lower edge of slip-resistant portion **1** on front flap **22** is a distance **D1** from top **25**, whereas the upper edge of slip-resistant portion **1'** on rear flap **24** is a distance **D2**, greater than **D1**, from top **25**. In this manner, slip resistant portions of adjacent folders do not contact one another, possibly causing unwanted sticking of adjacent folders.

It is contemplated that if vertically-offset slip-resistant portions are used, as shown in FIG. 6, the slip-resistant portion on the front flap should be the one closer to the top. This is because the front flap is usually contacted by the thumb of a person removing it, while the rear flap is contacted by the fingers. Since the fingers are longer than the thumb, they are more suited for the longer distance associated with the longer distance **D2**.

The folder **10** shown in FIG. 7 is exemplary of a file pocket **30**. File pocket **30** comprises a front flap **32**, and a rear flap **34**, connected at the bottom by folder bottom **36** comprising expandable fan folds, and partially along the sides by expandable side members **38**. File pockets have top edges **35** on front and rear flaps that typically stand higher than the enclosed papers, with a scored line **35** for bending down the top edges to gain easier access to enclosed papers. Such a configuration makes gripping a full folder for removal more difficult since upon gripping, the top flaps tend to bend inward into somewhat of a wedge shape that is more difficult to grip.

File pocket **30** is shown in FIG. 7 with another preferred embodiment for slip-resistant portion **1**, namely a slip-resistant portion that comprises recognizable designs or indicia **12**, such as the manufacture's name. By varying the material and method of application of slip-resistant portion **1**, visible, aesthetically pleasing designs or indicia **12** may be applied, including letters, numbers, or other decorative or utilitarian markings. For example, printing methods known in the art may be employed to apply colored adhesives or high coefficient of friction polymeric materials in virtually limitless designs, locations, and amounts.

FIG. 8 depicts an expanding file **40**, which along with expanding wallets, is distinguished primarily by its cover flap **49**. Expanding file **40** has a front flap **42**, a rear flap **44** connected at the bottom by expandable folder bottom **46** and along the sides by expandable sides **48**. Cover flap **49** is typically secured in a closed position by a tie string, elastic cord, Velcro® hook and loop fasteners, or other securement means (not shown). Expanding files are often stored in file drawers or cabinets, and are often stored in a hanging folder. To aid in lifting expanding file **40** from the top, slip-resistant portion **1** is applied, shown in this embodiment as parallel beads **14** of light-tack pressure-sensitive adhesive or high coefficient of friction polymeric material. Any number of beads, or stripes, of material **14** may be applied, and they may or may not be continuous along the full width of the folder. For example, stripes or beads of material may be applied in discontinuous segments as desired.

The folder **10** shown in FIG. 9 is exemplary of a hanging folder **50**. Hanging folder **50** generally comprises a front flap **52** connected to a rear flap **54** by folder bottom **56**, typically comprising a medial fold. Hanging folder **50** is primarily distinguished by hanging rods **59**, which are movably or immovably fixed to top edges **55**. The ends of rods **59** are exposed and notched, enabling the file to hang on a complementary standard parallel file frame in filing drawers or cabinets. As shown in the embodiment depicted in FIG 8, slip-resistant portion **1** may be applied

in a discontinuous manner, for example in a regular pattern of spaced apart dots. The dots may be a separate material, such as fine-grit abrasive paper affixed by adhesive. In general, however, the dots are preferably comprised of light-tack adhesive or high coefficient of friction polymeric material applied by any suitable manner during manufacture of folder **10**.

The slip-resistant portion embodiment shown in FIG. 9 may also represent raised bumps formed by embossing the paper stock in the area of the slip resistant portion. One desirable embodiment contemplated is to form a pattern of closely-spaced raised bumps with light-tack adhesive disposed in the non-raised areas surrounding the bumps. For example, a pattern of embossed "dimples" could be superposed on a pattern of adhesive such that the raised bumps do not have adhesive on them. A slip-resistant portion of this type would not feel tacky to the touch, but upon applying pressure to the raised bumps, they could collapse, so that a person's fingers would then contact the adhesive disposed around the bumps. In this manner, the tackiness would not be "activated" until needed by the user. Alternatively, the bumps need not be collapsible; the persons finger tips could simply press in around the bumps, contacting the slip-resistant material.

The slip-resistant portion shown in FIG. 9 may also represent holes, or slits, formed by very deep embossing, or by die punching. Deep embossing which actually causes penetration of the flap to form raised ridges may be provided as long as the flap integrity is maintained. Likewise, holes or slits made by die cutting may provide sufficient friction to act as a slip-resistant portion without the need for adhesives or polymeric materials.

The slip-resistant portion **1** shown in FIG. 9 may also represent an embodiment wherein slip-resistant portion **1** comprises a paper or plastic strip having molded-in bumps, holes, or other raised areas. The paper or plastic strip can be made separately by methods known in the art, and then joined to the folder to form a folder of the present invention. For example, thin strips of injection molded polypropylene could be formed and adhered to the folder.

Hanging folders come in a wide range of sizes and configurations, all of which may benefit by the improvement of the present invention. For example, in FIG. 10, a flat bottom, or box-bottom, hanging folder **60** is shown. Box-bottom hanging folder **60** generally comprises a front flap **62** connected to a rear flap **64** by a flat, horizontal folder bottom **66**. Box-bottom hanging folder **60** has hanging rods **69**, which are movably or immovably fixed to top edges **65**. Sides **68** are often not present, but if present they may be expandable, and are often reinforced for

durability. As shown in the embodiment depicted in FIG. 10, slip-resistant portion **1** may be comprised of a continuous network of interconnected lines **16** of slip-resistant material. Person's skilled in the art will recognize that the variations in continuous networks of interconnected lines are virtually limitless, and the embodiment shown is exemplary and not limiting.

Also shown in FIG. 10 is another beneficial advantage of the present invention. When slip-resistant portion **1** is applied as a light tack adhesive, such as an adhesive similar to the adhesive used on Post-it® notes, the slip-resistant portion **1** may serve a note-posting function. Notes **18** may be conveniently and removably stuck to folder **10** on the slip-resistant portion **1**. When used for this function, it may even be desirable to place the light-tack adhesive on other parts of the folder **10**, including on the inside.

Often reinforcing plastic film is applied to the top edges of folders. For example, hanging folders have reinforced plastic laminates folded with the paper stock enclosing the hanging rods, which serve to make the hanging folder more durable and wear resistant. One embodiment of the present invention contemplated is to combine the reinforcing laminate material of such folders with the slip-resistant portion **1** of the present invention. In such an embodiment plastic materials with a high coefficient of friction could be chosen as the reinforcing laminate material at the top edges of the folders. By doing so, the slip-resistant portion is "built-in" to a material having a separate primary function, thereby eliminating or reducing any costs associated with adding a separate material for slip-resistant material **1**.

In an alternative embodiment, a separate member, such as an injection molded plastic strip can be preformed and affixed to the flaps of a folder. For example, a thin plastic strip can be molded to have raised ridges, bumps, or other gripping surfaces. The strip can then be joined to the folder by methods known in the art. Thus, an existing folder can be easily converted to a slip resistant file folder by the application of the molded strip to the folder, such as by adhesive.

As stated above, one method for applying slip-resistant portion **1** is to manually apply light-tack adhesive tape to an existing folder **10**. However, commercially viable processes are preferred, such as a rotogravure printing process, schematically depicted in FIG. 11. Other printing processes and configurations known in the art may be used as necessary for particular manufacturing considerations, but the rotogravure process is described here as a preferred method. In general, such processes apply an adhesive or polymeric material in the melt state which is subsequently cured or dried to a substantially solid layer. By "melt state" is meant

hot melt as well as liquid state material temporarily having low viscosity to allow for application by printing, spraying, extrusion, or other application methods known in the art.

As shown in FIG. 11, folder paper stock **71** may be conveyed on a manufacturing line, such as conveyor **72** in a generally flat-out configuration during a continuous manufacturing process **70**. While being conveyed in such a process, the paper stock is passed to a heated rotogravure printing station comprising a backing roll **76** and engraved roll **77**, at which point a curable slip-resistant material, such as a light-tack, hot melt processible adhesive, is applied to one surface of the folder paper stock in a predetermined area and pattern. The slip-resistant material is then cured, dried, or otherwise substantially solidified to form the slip-resistant portion **1**. For example, curing station **73** may be positioned to cure by UV radiation or IR radiant heat, depending on the particular slip-resistant material used. Other compositions, such as high coefficient of friction polymers may be applied in a liquid polymer state in similar fashion, then cured or dried by suitable means known in the art to form slip-resistant portion **1**.

During the printing process, the slip-resistant material, is supplied to a heated supply tank **78** and pumped to the heated doctor application head **79** by a suitable metering pump. It is generally desirable to maintain constant temperature during the process; therefore, it is desirable to continually circulate the melted composition between the supply tank and the application head while maintaining an adequate amount in the reservoir. The heated doctor application head supplies the slip-resistant material to the engraved roll, the surface of which is engraved with the desired pattern for slip-resistant portion **1**.

In operation the engraved roll is loaded to the backing roll to force the paper stock into contact with the engraved roll. The backing roll can be any material that meets the process requirements such as natural rubber, synthetic rubber or other compressible surfaces. Loading pressures can vary, depending on paper stock thickness, composition thickness, and processing speeds.

If necessary, post-application processing for curing or otherwise substantially solidifying the slip-resistant material, such as UV curing, radiant heat drying, or other steps may be employed. Specific processing steps necessary for particular melt processible adhesives are known in the art and the steps disclosed may be modified, added to, or otherwise changed in ways that do not depart from the scope of the present invention. For example, melt processing comprising extrusion may be advantageously employed for certain adhesives or polymers.

Additionally, continuous layers of slip-resistant material, such as light-tack adhesives or high coefficient of friction liquid polymer materials, may be applied by spraying in predetermined patterns, for example by the process schematically depicted in FIG. 12. Again, folder paper stock **71** may be conveyed on a manufacturing line, such as endless conveyor **72** in a generally flat-out configuration during a continuous manufacturing process **70**. A spray nozzle **75**, or other suitable die, may be set up in position to intermittently spray a pattern of curable adhesive **74** or other curable polymeric material at predetermined positions, according to the various embodiments of the present invention. Further processing to cure, such as UV curing, radiant heat trying, and other advantageous processing steps may be employed as necessary for specific processes and equipment. As well, other spray processes and techniques may be used without departing from the scope of the present invention.

Permanent mechanical deformation can be accomplished by the use of opposing, mating dies, such as embossing dies **80** shown in FIG. 13. Many methods known in the art for embossing, stamping, or otherwise pressing paperboard can be used to form the ridges and valleys **9** that make up the slip resistant portion **1**. In FIG. 13, an upper die **82**, and a lower die **81** in operative, spaced relationship. The dies may be operative in a linear, reciprocating relationship essentially in the y-axis such that they operate in a stamping motion. Teeth **84** mate in a male/female relationship to effect the deformation of the paperboard of flap **22**. In this type of embossing, each flap **22** could be placed between dies **81**, **82**, pressed or stamped, and then removed. Alternatively folded or flat paper stock could be fed continuously on a manufacturing line as dies **81**, **82** operate in a repetitive, timed, cyclical motion to emboss the folders during continuous manufacturing.

FIG. 14 shows schematically another method of continuous embossing. Embossing dies **80** are in the form of mating ridged rollers **81**, and **82** that can have the general cross section as dies **80** of FIG. 13. As paper stock for flap **22** is conveyed in the manufacturing process, for example in the z-direction as shown in FIG. 14, it moves through the mating rollers, becoming embossed in a continuous fashion.

The apparatus depicted schematically in FIG. 14 provides for high speed embossed ridges and valleys, and can be carried out by the apparatus shown and described in U.S. Patent 5,691,035 issued Nov. 25, 1997 to Chappell et al. and hereby incorporated herein by reference. In particular, it is possible to modify the mating dies in ways that impart unique patterns of ridges and undeformed regions to

form slip resistant portions **1**. For example, by utilizing embossing dies in the form illustrated in FIG. 36 of the aforementioned Chappell et al. patent, a slip resistant portion **1** generally as shown in FIG. 15 can be formed. As shown in FIG. 15, slip resistant portion **1** is comprised of spaced sets of raised ridges **98** separated by undeformed portions **99**. Undeformed portions **99** can be made various dimensions such that they provide structural support to flap **92**, while ridges **98** provide for a high coefficient of friction for slip resistance.

In like manner, dies **80** can be modified to provide for other patterns of ridges and undeformed regions. In one embodiment, as depicted in FIG. 16, the undeformed regions can be shaped in the form of indicia, including letters, numbers, logos, and other identifying indicia.

While the above description contains many specificities, these should not be construed as limitations on the scope of the invention, but rather as illustrative of exemplary and preferred embodiments thereof. Many other variations are possible without departing from the spirit and scope of the invention as disclosed. For example, additional folds of flap material near top edges may be sufficient to form a slip-resistant portion. Accordingly, it is intended to cover in the appended claims all such variations, changes, and modifications that are within the scope of this invention.

WHAT IS CLAIMED IS: